Report to the H1 Collaboration

Max Klein
DESY Zeuthen

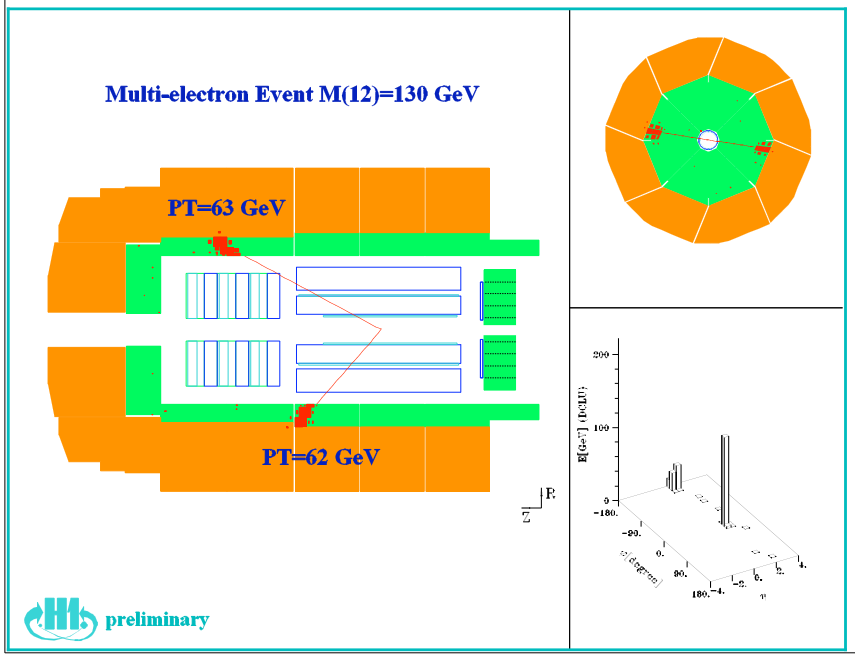
- Publications
- Run II
- Organisational Matters

H1 Collaboration Meeting, CPPM Marseille, September 16th, 2003

Multielectron Production at High Transverse Momenta in ep Collisions at HERA

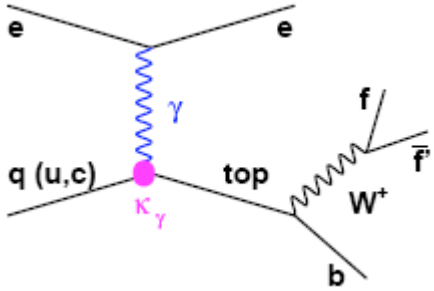
M(ee) > 100 GeV

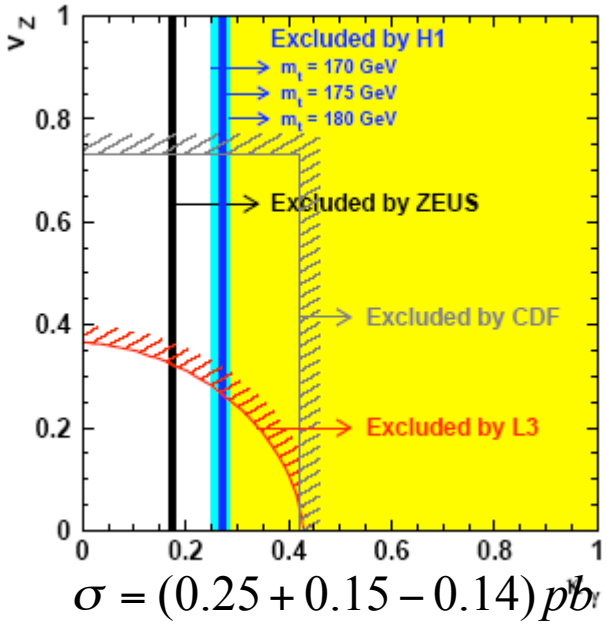
	events	SM (eq →eeeq)	
2e	3	0.25 +- 0.05	
3e	3	0.23 +- 0.04	115pb-1



accepted for publication in EPJ, with compliments

Search for Single Top Quark Production in ep Collisions at HERA

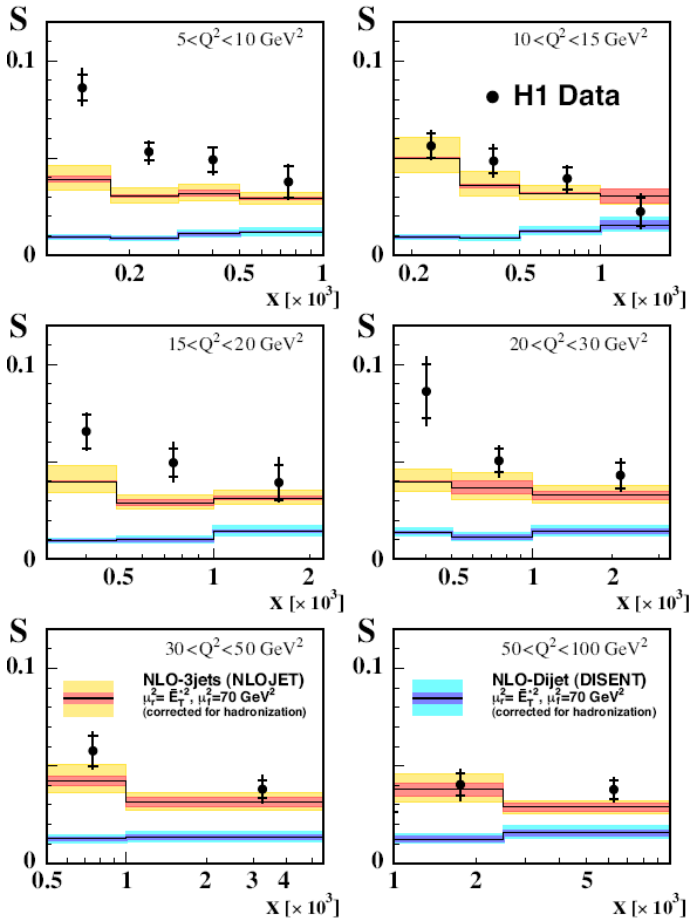


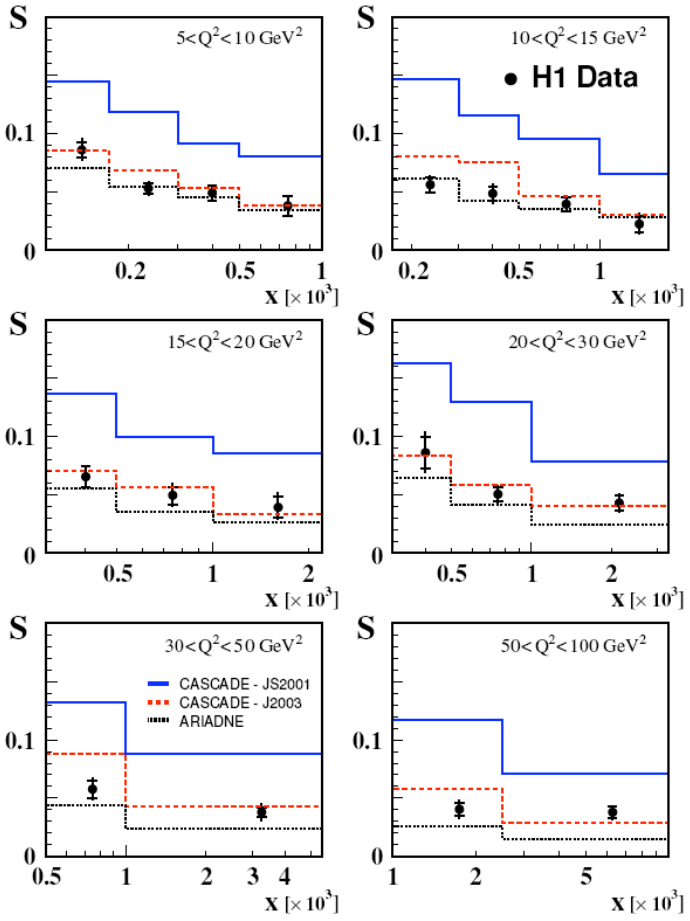


$$\sigma = (0.25 + 0.15 - 0.14)\,pb$$

118pb-1 e+- DESY 03-132
Publ.r: 9.9. submit next week

Inclusive Dijet Production at Low Bjorken x in Deep Inelastic Scattering





azimuthal decorrelations

- 1996/97 data, 21 pb-1
- public reading: August 20th → submit next week

Jan Kwiecinski t Cracow

From 40 preliminary results we expect still 28 publications.

For 57 abstracts to EPS we did send 54 papers in, which is a huge effort, not done by all other collaborations.

H1 was very well represented by results and speakers at the big and the small conferences: THANKS to all who worked hard and those who prepared talks well (|| EPS).

Emmanuel Perez and Paul Newman at Lepton-Photon 03 made beautiful representations of HERA physics for H1.

- **Remarks to our publications and physics results**

Final reading is useful, open to H1, check the final drafts. Dimuon paper Friday next week.

Final results may differ from preliminary results. We insisted, where possible, to the rule that the H1 data appear in journals published by the H1 Collaboration.

There are areas where we lost results with people and others on which no one is working (e.g. alphas from jets).

In high precision analyses cross checks and cross analyses are extremely useful and very desirable. Task of working groups to ensure necessary and possible cross-talk/work.

H1 and ZEUS have joint interest in best possible output. Physics coordinators will discuss with ZEUS where closer collaboration is useful. Find balance between fast, original, competitive H1 work and open, intelligent cooperation.

For joint results (LQ limits as first example) will need agreed procedure to publish these. Procedure will depend on subject.

Contact your counterpart in ZEUS for exchange of information, agreements on cuts and comparison of results, prior to the joint rehearsals in July 04. Still, independent results by two (not 4) experiments should be the rule and goal (beauty cross sections for example).

- **Further remarks to our publications and physics results**

INTERNATIONAL SCHOOL OF SUBNUCLEAR PHYSICS

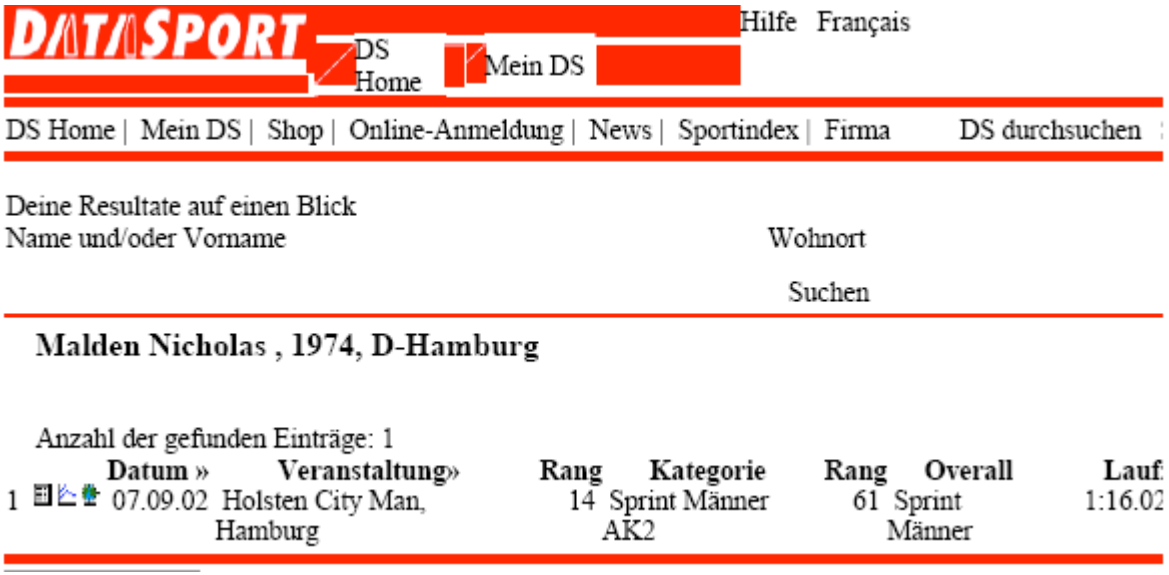
41st Course: FROM QUARKS TO BLACK HOLES: PROGRESS IN UNDERSTANDING THE LOGIC OF NATURE

Victor Lenderman
QED Compton F2
New Talents Award for
original experimental work

Paul Laycock
Diffraction at High Q2
Robert Hofstatter diploma

Sebastian Schaetzel
Dijets in Photoproduction
James Chadwick diploma

Congratulations



DATASPORT

Hilfe Français

DS Home | Mein DS | Shop | Online-Anmeldung | News | Sportindex | Firma DS durchsuchen

Deine Resultate auf einen Blick
Name und/oder Vorname Wohnort

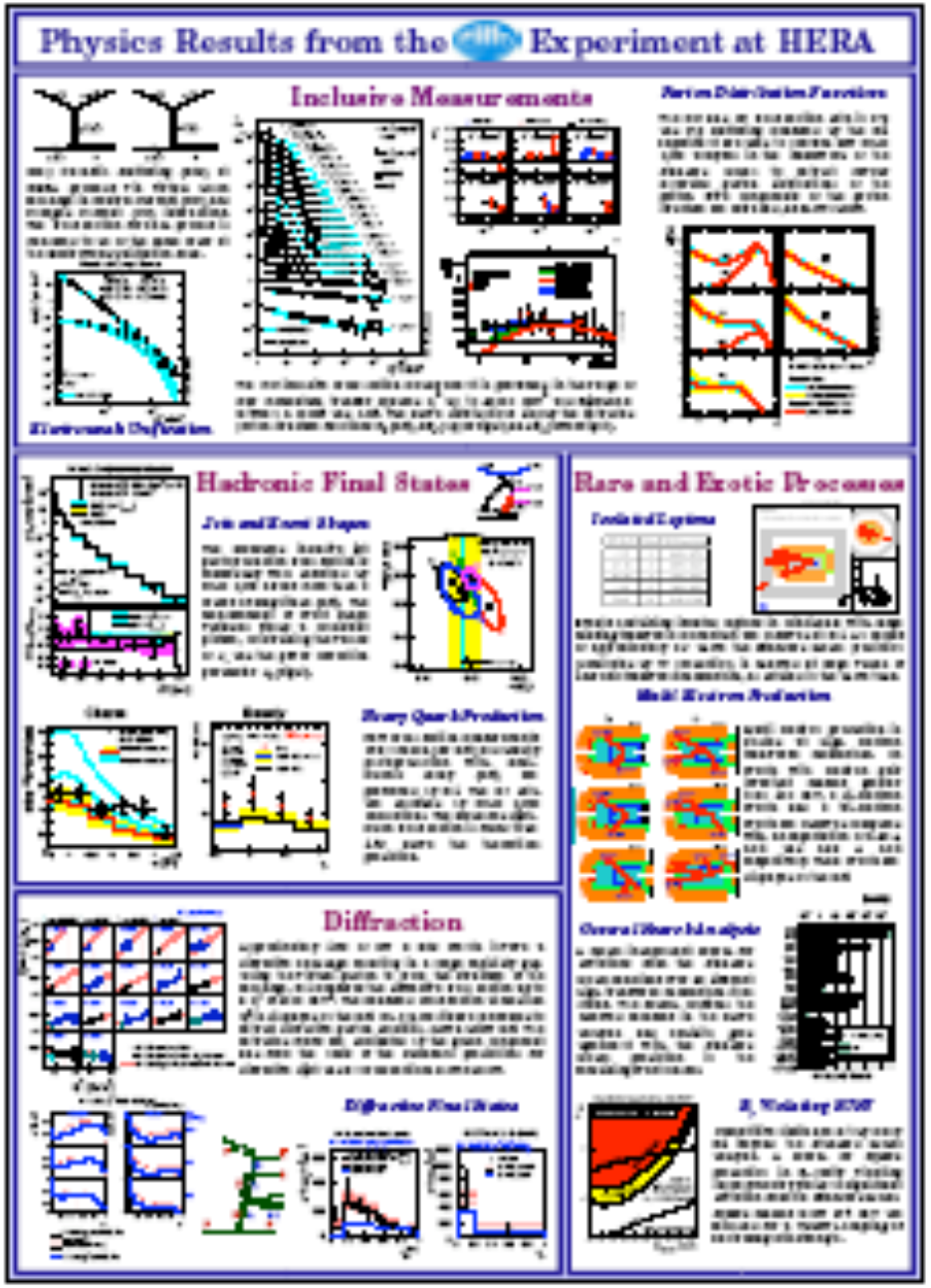
Suchen

Malden Nicholas , 1974, D-Hamburg

Anzahl der gefunden Einträge: 1

	Datum »	Veranstaltung»	Rang	Kategorie	Rang	Overall	Lauf
1	07.09.02	Holsten City Man, Hamburg	14	Sprint Männer AK2	61	Sprint Männer	1:16.02

Nick and Victor will supervise the cross talk meeting of H1 students on October 9 and 10 at DESY. Encourage your new and elder students to participate



Poster for LY 03

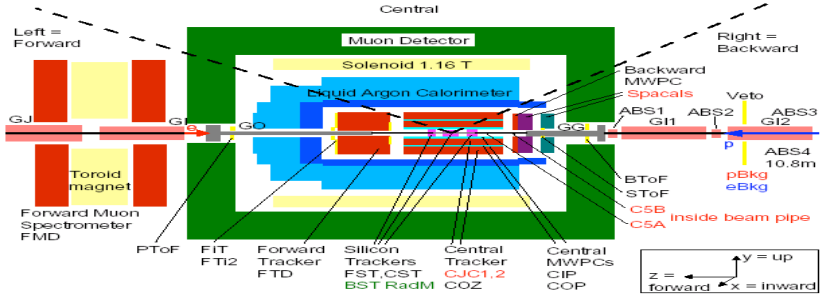
on H1 Physics

by Dave South

cf. H1 poster page

Poster for LY 03 by TG and MK

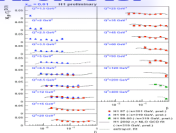
Upgrades for high luminosity HERA running



The H1 detector with some of the 25 upgrade projects undertaken and beam line elements for the HERA high luminosity upgrade of the electron-proton interaction region

Very Forward Proton Spectrometer

HERA studies have demonstrated that the colour neutral exchange responsible for diffraction, (the "pomeron") is composed of quarks and gluons.



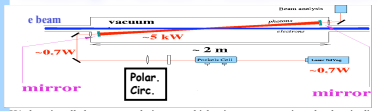
The clean dominant and IP structure evolves according to the same QCD equations that govern proton structure (see talk) and measuring its four momentum would reduce systematic errors and make possible new measurements. This is the task of the Very Forward Proton Spectrometer recently installed at 220m from H1 on the proton beam line. The VFPS will

of four Roman Pots, containing scintillating

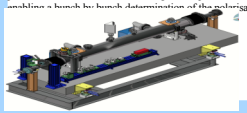
d a scintillating tile trigger system. These can

within a fraction of a millimetre of the

Fabry Perot Polarimeter

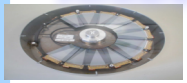


H1 has installed a new polarimeter which aims at measuring the longitudinal polarisation λ of the 27.6 GeV electron beam via Compton scattering off 1.165 eV photons. The cross section is calculable in QED and depends on λ and on the circular polarisation of the laser beam. Large laser power results in a high statistical accuracy

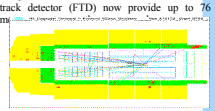


Schematic view of the new polarimeter with Fabry Perot cavity. With the laser frequency tuned to resonance conditions a gain of 7000 was measured as expected. The new "LPOL" will be operated during the HERA II phase.

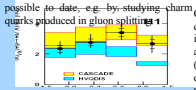
Forward Tracking



The Forward Silicon Tracker (FST) consists of 12 single sided silicon sensor planes (S/N = 32) measuring tracks in three projections covering the polar angle range $7° < \theta < 17°$. The elliptical and excentric beampipe limits the azimuthal acceptance. New drift chambers in the forward track detector (FTD) now provide up to 76



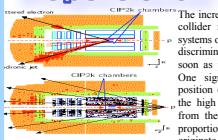
Data from running in 2002, such as the



event shown here, provide first hints of the physics opportunities that will be provided by efficient forward tracking. These include the investigation of QCD radiation patterns closer to the proton, up to pseudorapidities $\eta \sim 2.8$, than has been possible to date, e.g. by studying charm quarks produced in gluon splitting

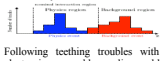
Current measurements suggest that NLO QCD calculations (HVQDIS) do not describe the data in the forward region ($\eta > 0$), whereas approaches based on the CCFM equation (CASCADE) are more successful. Forward charm data will aid progress towards an understanding of gluon radiation in this complex region.

Central Inner Proportional Chamber



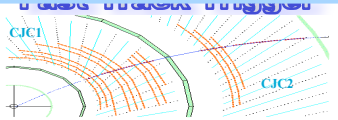
The increased luminosity of the upgraded HERA collider represents a challenge for the trigger systems of H1. Efficient data taking requires good discrimination between background and signal as soon as possible after collisions have occurred. One signature that allows separation is the position of the event vertex. Signal events, e.g. the high Q^2event above left, are seen to come from the ep interaction point, whereas a large proportion of background events, below left, originate downstream of H1. The Central Inner Proportional (CIP) chambers are designed to provide the necessary discrimination.

The multilayer proportional chambers of the CIP allow the position of the event vertex along the beam axis to be reconstructed, as illustrated



Following teething troubles with the electronics, caused by cooling problems, the CIP has now been repaired and installed within H1, photo left, ready for data taking in September 2003.

Fast Track Trigger



4 trigger layers formed out of three layers of wires each. The wires are readout at both z ends to enable three-dimensional track reconstruction

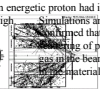
The new Fast Track Trigger is designed to reconstruct tracks and resonances (D*) within the first 3 levels (L1-L3) of the multi-stage H1 trigger system. Using a subset of wires of the central jet drift chamber (CJC) the FTT reconstructs tracks down to 100 MeV momentum within the L2 latency of ~23µs. To reach high momentum resolution (of ~5% at 1GeV) dedicated algorithms are implemented using high density FPGA's. Track fits are done in DSP's. At L3 commercial processor boards are used to reconstruct invariant masses. The system will be used in the high luminosity data taking from fall 2003 onwards.

Level 1 reconstruction of hits (Qt) and of r-φ-tracks on ~30 FEM boards with five Altera APEX 20K600E FPGAs

Backgrounds at HERA II

Increased Backgrounds Following HERA Upgrade

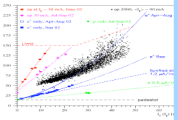
Following the HERA upgrade the H1 drift chamber currents were higher than acceptable. The rate of events in which an energetic proton had interacted in the material upstream of the detector was observed to be high. Simulations and background studies with the HERA machine



showed that source of these events was the diffraction of protons 2 to 20 m upstream of H1 off the residual gas in the beam pipe. The scattered protons then interact

with material of collimators etc.

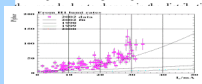
Other possible sources of background, e^+ beam-gas interactions and scattered synchrotron radiation (SR), were found to be less important. The size of the various effects is shown by the plot of the contributions they make to the CJC current, obtained from e^+ only, p only and colliding beam studies. The CJC current caused by a p current $I_p = 30$ mA increases with increasing e^+ current as the resulting SR desorbs gases from the



beampipe walls. It is expected to decrease with time as the HERA vacuum improved, but they did not reach an acceptable level.

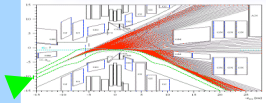
Proton Background

One possible cause of the increase of the p-induced background compared to running before the HERA upgrade is a change in the composition of the residual gas. The charged multiplicities of p-gas events recorded before and after the upgrade in the central drift chamber were compared with the expectations for pN interactions with various nuclei, N. The expectations were calculated using MC simulations which include the effects of H1 and of the HERA beam line. No evidence for a change of the gas composition was found. A slightly increased multiplicity was observed as is expected for a given species A following



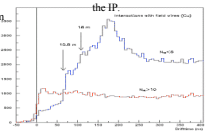
For a known gas composition the Bethe Heitler scattering rate as measured by the H1 luminosity detector determines the pressure in the interaction region. The pressure was found to be significantly higher in 2002 than in previous years. A non-linear component in the current dependence hints to HOM heating besides photodesorption effects.

Positron Background



Schematic view on the H1 interaction region. The positron beam, now bent near the IP, emits synchrotron radiation which causes desorption of gases. Beam steering has to ensure that no collimator or beam pipe wall is hit before 10.8m distance from the IP.

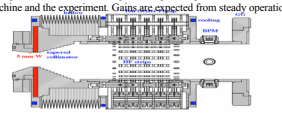
Drift time distribution for events from lost positrons (N<5) and from synchrotron radiation events (N>10). The arrows indicate the arrival time due to backscattering at upstream collimators (data from single e fills).



While the effect from only synchrotron radiation on the background is small, it causes a dynamic increase of pressure during ep operation.

Prospects

During the HERA shutdown 2003 a number of measures was realised to combat the beam induced background - with further pumps (in the GA e chambers left at 30m and at C5), improved cooling (GI/GJ magnets right), improved shielding and RF screening. Refined diagnostics on radiation, temperature, gas composition etc. was installed both in the machine and the experiment. Gains are expected from steady operation.

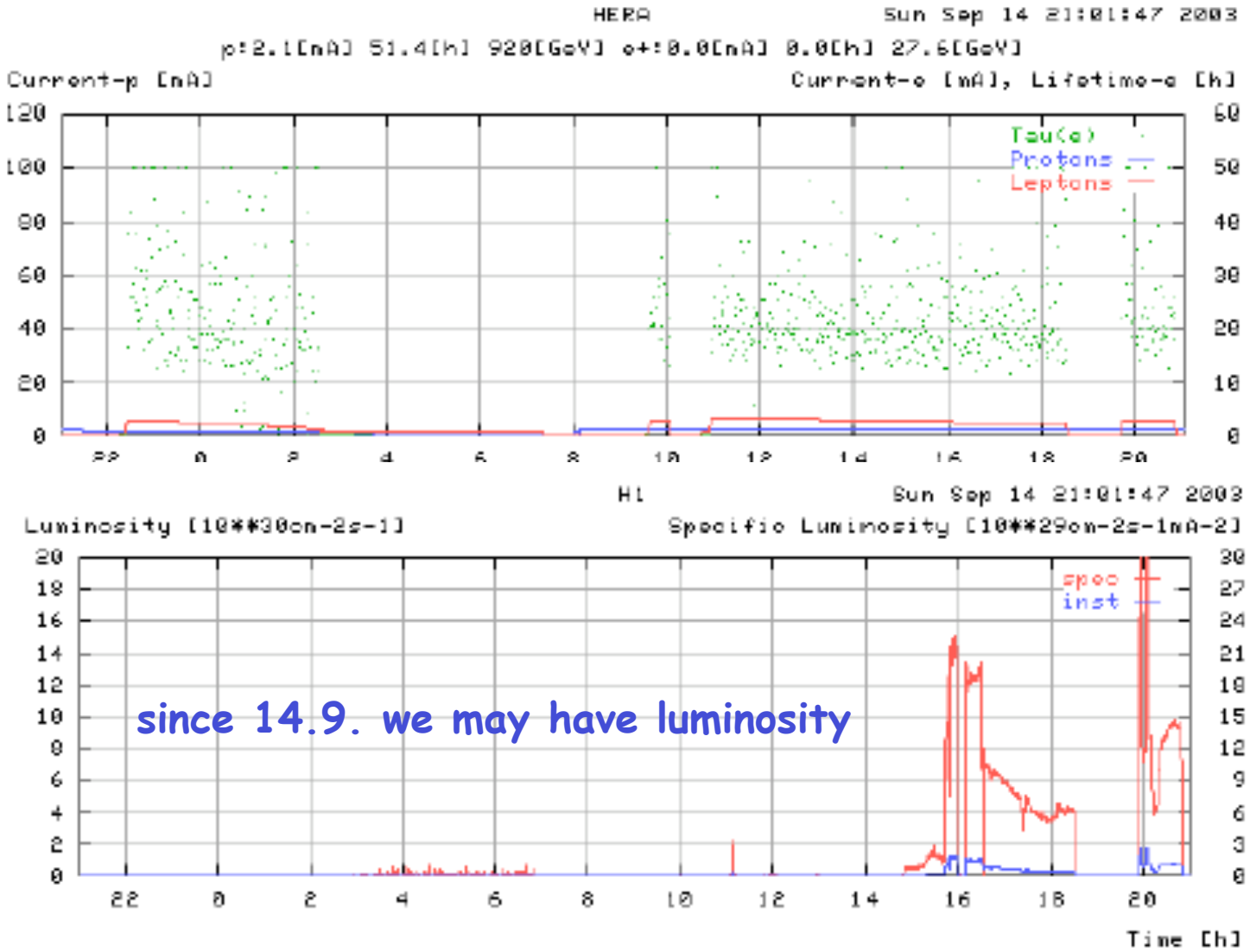


New C5 collimator installed in H1 at -1.5m from IP with integrated getter pump and tapered geometry reducing higher order mode (HOM) heating effects.

Reduced backgrounds enabling high current operation, large positron beam polarisation, as achieved for the first time in February 2003 (below), and an improved apparatus will lead the H1 experiment to its second phase with sensitive searches and precision tests of QCD.

"so verging meine Zeit, die auf Erden mir gegeben war" (bb)

BUT



- too many ideas to be realised
- radiation hard calorimeter
- young experts leaving soon the framework
- loss of acceptance due to non machined fibres
- we can live with the situation as it is
- wir sind halt zu spaet dran
- branch 11
- the trigger currently does not work
- I am the only person responsible for all aspects of the detector
- commissioning is much longer than expected
- personals are scarce and access days also
- how stable is the detector operation during future luminosity runs
- horizontal acceptance in HERA II beam optics
- Man macht sich immer seine Gedanken
- the beam hits the detector
- dead cells and slow program
- H1REC
- triggering at HERA II
- $\frac{1}{4}$ is currently dead
- we are desperately missing the dedicated effort → email alarm
- the new CAEN TDC is defect

main worries as briefly summarised upon request by detector responsibles

thanks for the info and good news as well

We need to be very careful and collaborate well

Remarks to the coming run

HERA is on track according to schedules made in June. Lumi from 8.10. onwards.
T_pipe <80. Radiation monitors running in, integrated dose? New Etag40 crystals, when in?

H1's goals till end of 2004:

+ efficient data taking [trigger, background group, data quality tool 12(18) NOT in...]

+ measurement of sigma CC and NC at high Q2 with polarised beams → Moriond 04
  requires one switch of polarisation before xmas 2003

+ double HERA I statistics before the beam changed to e- [PRC?]

[FW: "decisions should be driven by what we learn" - an ancient management wisdom]

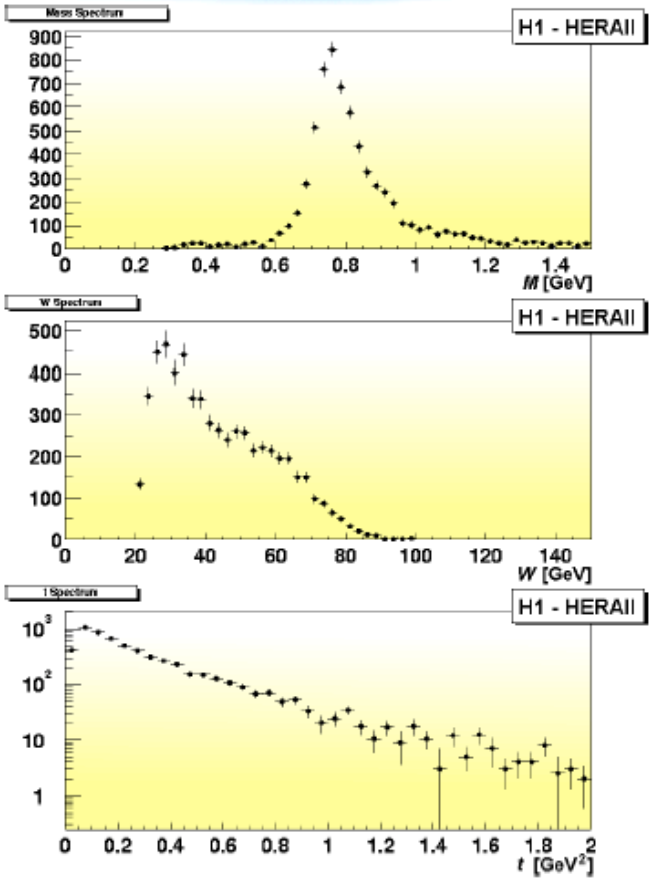
Continuous operation till xmas 2004 requires to have 20 run coordinators.
Should we perhaps reconsider this task and go for a small run-coordination team?

Every second H1 member becomes shift leader, get prepared and "visit" the hall.

Safety accident at BNL, south hall (30mA limit for Ie now): take care as Claus K. does

HERA–II: The Tale Continues

- Spring 2003: Special data taken with dedicated ρ^0 photoproduction triggers
- More than 13000 events taken
- W range 25–85GeV
- $|t|$ range up to 2GeV^2
- Enough data for double–differential measurement of ρ^0 photoproduction cross section



data taken in spring 2003, shown in summer at EPS 03: JB+BL+others: H1 can be FAST

people

EC Thanks to Andy Mehta, Yves Sirois and Dietrich Wegener

propose Nick Malden, Stefan Schmitt and Franz Eisele
for a period of 2 years as new EC members

Physics Coordination: propose to prolong Paul Newman for 1 year

New diffractive WG convener: Hannes Jung
as Frank Peter Schilling is the H1 trigger coordinator now

Polarimeter convener Stefan Schmitt, so far

Thanks to Ursula Berthon for all her competent and dedicated work.

Welcome to many new students and new members of H1 and merci et au revoir to those who left (Aachen 3: Guenter Fluegge's group)

Sofia group works out technical specification for gas system update
visit of Stamenov, director of the institute, in October, goal is to join H1

H1 is invited for the next outside meeting in September 2004 by the group of Podgorica (13.9.-17.9.2004)

- Natasa Raicevic
- Slobodan Backovic
- and Podgorica group

Montenegro and Serbia are the only remaining autonomous entities that make up Yugoslavia. All the others became independent in the 1990's. Montenegro is striving to increase its autonomy within the rump Yugoslav Federation. It is a country of a fiercely independent people who live in scenic mountains and on a short, scenic coastline.

The Temple HERA 2 in Italy, Paestum

before **after**

the Upgrade work

Let us work together to transform the expectations into reality and
to solve the fundamental questions which HERA poses and allows to study